

Application No. 10/720,617
Attorney Docket No. 2003B125

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Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (Currently Amended): A catalyst composition ~~consisting essentially including~~ ~~active components optionally combined with a support, said active components~~ ~~consisting of:~~

(a) a rhodium component deposited from a nitrate precursor and present in an amount ~~such that the catalyst composition comprises~~ less than 3.0% of rhodium by weight of the total catalyst composition; and

(b) an indium component deposited from a nitrate or formate precursor and present in an amount ~~such that the catalyst composition comprises~~ at least 0.3% and less than 5.0% of indium by weight of the total catalyst composition.

Claim 2 (Currently Amended): The catalyst composition of claim 1 and ~~comprising~~ ~~wherein rhodium is present in an amount~~ at least 0.25% and less than 2.5% ~~of rhodium~~ by weight of the total catalyst composition.

Claim 3 (Currently Amended): The catalyst composition of claim 1 and ~~comprising~~ ~~wherein rhodium is present in an amount~~ at least 0.3% and less than 1.5% ~~of rhodium~~ by weight of the total catalyst composition.

Claim 4 (Currently Amended): The catalyst composition of claim 1 and ~~comprising~~ ~~wherein indium is present in an amount~~ at least 0.4% and less than 4.0% ~~of indium~~ by weight of the total catalyst composition.

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Claim 5 (Currently Amended): The catalyst composition of claim 1 and ~~comprising~~ wherein indium is present in an amount at least 0.5% and less than 3% of indium by weight of the total catalyst composition.

Claim 6 (Original): The catalyst composition of claim 1 wherein the molar ratio of rhodium to indium is about 0.2 to about 1.1.

Claim 7 (Original): The catalyst composition of claim 1 wherein the molar ratio of rhodium to indium is about 0.35 to about 0.75.

Claim 8 (Currently Amended): The catalyst composition of claim 1 and ~~also comprising~~ ~~wherein said support is present~~.

Claim 9 (Currently Amended): The catalyst composition of claim [[1]] 8 wherein the support is selected from alumina, zirconia and ceria-alumina.

Claim 10 (previously presented): The catalyst composition of claim 1 wherein the catalyst composition has been treated in a reducing atmosphere at a temperature of at least 300°C.

Claim 11 (Currently Amended): A method for making a catalyst composition, the method comprising:

(a) applying a rhodium nitrate to an alumina, zirconia, or ceria-alumina support; and

(b) applying an indium formate or nitrate to the support; to produce a catalyst composition ~~according to claim 1 which comprises 0.3-3.0% rhodium and and less than 5.0% of indium by weight of the total catalyst composition including the support.~~

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Claim 12 (Original): The method of claim 11 wherein the rhodium compound and the indium compound are applied to the support concurrently.

Claim 13 (Original): The method of claim 11 wherein the rhodium compound and the indium compound are applied to the support consecutively.

Claim 14 (Original): The method of claim 11 wherein at least one of the compounds is applied to the support by impregnating the support with a solution of the compound.

Claim 15 (Original): The method of claim 11 wherein at least one of the compounds is applied to the support by precipitating the compound from a solution containing ions of at least one of rhodium and indium.

Claims 16 - 18 (canceled)

Claim 19 (Original): The method of claim 11 and further including, after at least one of (a) and (b), calcining the support at a temperature of about 100°C to about 600°C.

Claim 20 (Original): The method of claim 11 and further including, after (a) and (b), treating the support in a reducing atmosphere at a temperature of about 100°C to about 600°C.

Claim 21 (Original): The method of claim 20 wherein said treating the support is conducted at a temperature of about 300°C to about 500°C.

Claim 22 (Withdrawn): A process for selectively removing alkynes or diolefins from a feedstock also containing olefins, the process comprising contacting the feedstock with hydrogen in the presence of a catalyst composition made by the method of claim 11.

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Claim 23 (Withdrawn - Currently Amended): A process for selectively removing C₂ to C₄ alkynes or diolefins from a feedstock also containing C₂ to C₄ olefins, the process comprising contacting the feedstock with hydrogen in the presence of a catalyst composition according to claim 1 comprising a rhodium component and an indium component, and the process producing an olefin-enriched product stream containing less than 20 weight % of oligomers of said olefins.

Claim 24 (Withdrawn - Currently Amended): The process of claim 23, and said process producing an olefin-enriched product stream comprising containing less than 10 weight % of oligomers of said olefins.

Claim 25 (Cancelled)

Claim 26 (Withdrawn - Currently Amended): The process of claim [[25]] 23, wherein the alkynes or diolefins have 2 to 4 carbon atoms and the feedstock also contains C₂ to C₄ olefins

Claim 27 (Withdrawn - Currently Amended): The process of claim [[25]] 23, wherein said contacting is conducted at a temperature of from about 20°C to about 150°C, a pressure of from about 690 kPa to about 4100 kPa, and a molar ratio of hydrogen to alkynes and diolefins of from about 1 to about 1000.

Claim 28 (Withdrawn - Currently Amended): The process of claim [[25]] 23, wherein said contacting is conducted at a temperature of from about 30°C to about 100°C, a pressure of from about 1400 kPa to about 3400 kPa, and a molar ratio of hydrogen to alkynes and diolefins of from about 1.1 to about 800.

Claim 29 (Withdrawn - Currently Amended): The process of claim [[25]] 23, wherein at least one of the feedstock and the hydrogen contains carbon monoxide in an amount up to 1 ppm.

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Claim 30 (Withdrawn - Currently Amended): The process of ~~claim 25~~ claim [[25]] 23, wherein at least one of the feedstock and the hydrogen contains carbon monoxide in an amount up to 0.5 ppm.

Claim 31 (Currently Amended): A supported catalyst composition consisting essentially of a rhodium component and an indium component, said supported catalyst composition effective for the selective hydrogenation of alkynes and diolefins to olefins, wherein said support is selected from the group consisting of comprising an alumina, zirconia, or ceria-alumina support; said catalyst composition further characterized as having less than 3.0 % rhodium by weight of the total supported catalyst composition, deposited from rhodium nitrate; and having 0.3-5.0% indium by weight of the total supported catalyst composition, deposited from indium nitrate or indium formate.

Claim 32 (New): The supported catalyst composition of Claim 31, wherein said support is selected from the group consisting of theta alumina and zirconia.

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SUPPORT FOR THE AMENDMENTS

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Claim 1 has been amended to be consistent with the language provided at paragraph [0021]. Support for "nitrate precursor" and "nitrate or formate precursor" is found at paragraph [0073]. Claims 11 and 23 have been simplified to depend from Claim 1 and Claim 22 has been simplified by depending from Claim 11, so that the characterization of the catalyst composition is the same in all the claims. Claim 31 is amended to be consistent with the previously presented Claim 1 with respect to the "consisting essentially of" language; the other amendments to Claim 31 are believed to be strictly editorial in nature. Support for theta alumina in Claim 32 is found in Example 2 of the present disclosure.

It is believed there is no possibility of new matter.